Hawaiian Endangered Bird Conservation Program

Report To:
U.S. Fish and Wildlife Service
November 16, 1998 - November 15, 1999

The Peregrine Fund

World Center for Birds of Prey
5666 West Flying Hawk Lane
Boise, Idaho 83709

Keauhou Bird Conservation Center
P.O. Box 39
Volcano, Hawaii 96785

Maui Bird Conservation Center
535 Olinda Rd.
Makawao, Hawaii 96768

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ABSTRACT

In 1999, The Peregrine Fund (TPF) had eight goals for the Hawaiian Endangered Bird Conservation Program:

1) Continue the restoration program for the endangered Puaiohi (*Myadestes palmeri*) by breeding this species in captivity and reintroducing birds to establish a second population in the Alaka`i Swamp, Kaua`i.
2) Continue captive-breeding `Alala (*Corvus hawaiiensis*) at the Maui Bird Conservation Center (MBCC) and Keauhou Bird Conservation Center (KBCC) for reintroduction to the wild.
3) Continue captive-breeding Nene (*Nesochen sandvicensis*) at the MBCC and KBCC for the State of Hawai`i's Division of Forestry and Wildlife's (DOFAW) Nene release program.
4) Continue to rehabilitate and renovate facilities at MBCC.
5) Collect wild eggs from Maui Parrotbill (*Pseudonestor xanthophrys*), Hawai`i Creeper (*Oreomystis mana*), Hawai`i `Elepaio (*Chasiempis s. sandwichensis*), Hawai`i `Akepa (*Loxops coccineus*) and `Akiapola`au (*Hemignathus munroi*); continuing to develop artificial incubation, hand-rearing and release techniques for restoration of endangered forest bird populations.
6) Establish long-term captive husbandry and breeding requirements for endemic Hawaiian passerines.
7) Initiate and complete Phase III construction of a second Forest Bird Barn and initiate construction of four additional `Alala aviaries at KBCC.
8) Continue the environmental education program, funded by grants and private donations and publish a conservation primer for Hawaiian students (Treasures of the Rainforest).

To date, over 190 endemic songbirds have been hatched at TPF facilities in Hawai`i, (hatchability = 83%, survivability to 30 days = 89%) (Table 1). In 1999, fourteen captive-reared Puaiohi were released in the Alaka`i Swamp, Kaua`i. All the release birds survived 30 days and at least eight chicks have successfully fledged in the wild (Tweed, pers. comm.). This is the first successful endangered passerine conservation program using recovery techniques that include: collection of wild eggs, hand-rearing, captive-breeding and release; where reintroduced birds subsequently survived and bred in the wild.

All TPF's goals for 1999 were met except for the collection of wild eggs from `Akiapola`au and Hawai`i Creeper. Biologists from the U.S. Geological Survey - Biological Resources Division (BRD), U.S. Fish and Wildlife Service (Service), DOFAW and TPF were unable to locate accessible nests for these species.

TPF restoration programs are implemented in collaboration with the U.S. Fish and Wildlife Service (Service), DOFAW, U.S. Geological Survey Biological Resources Division (BRD),

Kamehameha Schools Bernice Pauahi Bishop Estate (KSBE), the Zoological Society of San Diego (ZSSD) and the Kaua`i, Maui and `Alala Partnerships.

INTRODUCTION

Changes in the natural environment of the Hawaiian islands due to increased human activity and introduced non-native plants, vertebrates and invertebrates is causing the steady decline of endemic bird populations. More than half of all the federally listed endangered species in the United States inhabit this island state, and Hawai`i is considered an extinction capitol of the world. Avian disease, habitat degradation and introduced alien species (rats, cats, mongoose etc.) are all contributing to the extinction crisis.

For many bird species in Hawai`i, habitat enhancement and protection is not occurring quickly enough to guarantee a safe haven for populations on the verge of extinction. In these critical cases, manipulation of wild birds and hands-on intervention techniques are being used as recovery management tools. Collection of wild eggs to establish captive breeding programs to produce birds for reintroduction has proven to be a valuable conservation strategy for Peregrine Falcons (*Falco peregrinus*), California Condors (*Gymnogyps californianus*), and San Clemente Island Loggerhead Shrikes (*Lanius ludovicianus mearnsi*). Populations of endangered bird species can be established in captivity without removing adult birds from the wild. Also, captive propagation of hand-reared birds is more successful than attempting to collect and breed wild-caught birds. However, propagation of birds in captivity is labor-intensive, costly and not necessarily an effective recovery tool for all species. For some endangered bird populations translocation, and/or intensive habitat management is a preferable recovery strategy.

In 1993, TPF, at the request of the Service and DOFAW, began a program for restoration of native Hawaiian birds. To date, over 190 endemic passerines have been hatched at TPF facilities on Maui, Kaua`i and the Big Island (Table 1). The technology is being developed to: a) collect wild eggs for artificial incubation and hand-rearing b) propagate endemic Hawaiian forest birds in captivity and c) release native Hawaiian songbirds to the wild. Conservation Partnerships have been formed with Kamehameha Schools Bernice Pauahi Bishop Estate (KSBE), the Zoological Society of San Diego (ZSSD), private land-owners and organizations on Kaua`i, Maui and the Big Island to implement these recovery activities.

HAWAIIAN ENDANGERED BIRD CONSERVATION PROGRAM HISTORY - ACTIVITIES AND MILESTONES:

1993

- In collaboration with the Service, DOFAW, McCandless Ranch, KSBE, BRD, the

ZSSD and Greenfalk Consultants, seven `Alala are hatched, hand-reared and five released to the wild.

1994

- Veterinary/Pathology consortium established including Drs. Pat Morris, Don Janssen, and Bruce Rideout (ZSSD).
- `Alala studbook initiated.
- Five `Alala reared and seven released (additional birds from DOFAW).
- Service modifies an existing agreement with TPF to design, build and operate a captive propagation facility for endangered Hawaiian Forest Birds.
- Congressional Appropriation, $1.5 million, for capital construction is received.
- Site is chosen for the development of the KBCC on 155 acres of KSBE land in Volcano, Hawai`i. Subsequently a 35 year license agreement is signed and the Regional Director of the Service approved the Environmental Assessment.
- Five Common `Amakihi hatched and reared; the first successful artificial incubation and hand-rearing from hatch of a Hawaiian Honeycreeper species.

1995

- Common `Amakihi, `Oma`o, I`iwi, and Hawai`i `Elepaio hatched and reared.
- Hack tower built in PWW and `Oma`o and `I`iwi released to test release techniques. `Amakihi released at KBCC to test release techniques.
- Pest control program begins at KBCC for rats, cats, mongoose, mosquitoes and introduced plants.
- Native plant propagation program for native plants is initiated. These plants are now being used to enrich aviary environments and re-forest KBCC.
- Began food production program for maintaining Hawaiian bird species in captivity.
- Finished the A+E for the KBCC by completing the plans, the site survey, soils exploration and civil engineering.
- Facility plans were reviewed and bids submitted by six general contractors. Kawika General Contracting was selected. Construction of Phase I initiated.
- In collaboration with KSBE, several weeks spent working in the Alaka`i Swamp doing reconnaissance for rare Kaua`i endemic bird species. Observations were made on six Puaiohi and one observations of a Nukupu`u.
- KBCC building site blessed according to Hawaiian tradition.

1996

- Phase I construction of KBCC is completed including: brooder/office building, forest bird barn, staff residence, `Alala aviary, storage building, civil work, water, power, A+E, and permits. Began operation of the facility on March 15, 1996.

- Assumed management of the Olinda Endangered Species Propagation Facility at the request of DOFAW, and the Service, March 1, 1996 -- renamed the Maui Bird Conservation Center (MBCC).
- Cleaned, renovated and remodeled areas in MBCC critical to the captive propagation of `Alala (incubation and brooder rooms, bird kitchens).
- Reared six `Alala, 23 `Oma`o, 11 Palila, and five Puaiohi.
- Developed a behavioral program to monitor incubation attentiveness in captive `Alala, in collaboration with the ZSSD.
- Began intern/volunteer program at KBCC.
- Added two new local members to veterinary consortium: Sterrett Grune (Big Island) and Greg Massey (Maui).
- Dr. Bruce Rideout, Director of Pathology - ZSSD is named Research Associate of TPF.
- Built a second hack tower for the release of `Oma`o at Pu`u Waawa`a Forest Reserve (PWW).
- Released 23 additional `Oma`o (25 total) at PWW.
- Released four `Alala in Kona.
- Hosted the semi-annual TPF Board Meeting, in Hawai`i.

1997

- Received congressional appropriation ($987,500) for capitol construction (Phase II).
- Completed Phase II construction of the KBCC: four laboratories, eight fledgling aviaries, five `Alala aviaries, four Nene pens, staff residence and road improvements.
- Initiated major renovation of MBCC by repairing `Alala aviaries, painting and cleaning incubator and chick rearing rooms for forest birds, and constructing new outdoor Nene enclosures.
- Hatched and reared ten Puaiohi, four Hawai`i Creeper, two `Apapane, five `Akohekohe, one Maui Parrotbill and nine `Alala.
- Transferred two pairs of `Alala and two pairs of Nene from MBCC to KBCC for breeding. Transferred one juvenile `Alala from KBCC to MBCC.
- Released eight `Alala in Kona.
- Initiated captive population studbooks for all species housed in captivity.

1998

- Hatched and reared 23 Puaiohi , five Hawai`i Creeper, four `Alala, one `Elepaio and one `Akepa. The `Akepa is the smallest passerine successfully artificially incubated and hand-reared in captivity.
- Hatched and reared 31 Nene (15 for DOFAW release program).
- First captive-breeding of Puaiohi (parents collected as wild-eggs in 1996 and 1997).
- First reported observation of hand-reared reintroduced birds breeding in the wild (`Oma`o).

- Zoological Society of San Diego sponsored a two week Avian Medical Training Workshop at KBCC for TPF staff, February 1998.
- Added a new member to the veterinary consortium: Stephen Diana (veterinarian, TPF).
- Initiation of Environmental Education Program at KBCC.
- Congressional Appropriation, $985,000, for capitol construction (Phase III) is received.

1999

- Hatched and reared five Puaiohi, two `Alala, five `Akepa, two Maui Parrotbill, and eight `Elepaio.
- Hatched and reared 13 Nene for DOFAW 's release program.
- Fourteen captive-reared Puaiohi were released in the Alakai Swamp, Kauai. This is the first successful endangered passerine conservation program using recovery techniques that include: collection of wild eggs, hand-rearing, captive-breeding and release; where reintroduced birds subsequently survived and bred in the wild.
- Completion of Phase III construction of a second Forest Bird Barn at KBCC.
- Completion of additional Nene enclosures at KBCC (total = 8).
- Continuation of Environmental Education Program: 1600 students participated in TPF programs in 1999. Publication of Treasures of the Rainforest - an introduction to the endangered forest birds of Hawai`i.
- Continuation of renovation of facilities at MBCC: `Alala aviaries and Nene pens. The "great room" was painted/carpeted in preparation for an environmental education program on Maui.
- Began intern/volunteer program at MBCC.

FACILITIES AND LAND MANAGEMENT

Keauhou Bird Conservation Center (KBCC)

Phase III construction was initiated and one additional Forest Bird Barn/kitchen complex was completed. An automatic misting system was installed in all forest bird aviaries in addition to permanent fixtures to facilitate bird introductions. In collaboration with the University of Hawai`i (UH) Experimental Agricultural Station, native plants were propagated and out-planted into the new aviaries.

As part of Phase III , four additional `Alala aviaries are under construction. Remote video was installed in one `Alala enclosure and misting systems were installed in all aviaries. New aviaries are designed to facilitate mate choice prior to the breeding season with the option to separate aggressive males during the nesting period.

Additional Nene enclosures were constructed at KBCC (total = eight) and permanent water sources were installed in four Nene pens, including below surface pools.

A ninety foot lava rock wall is being built (donated) to provide seating for environmental education groups. Predator control, noxious weed eradication and planting of native plants continues on the 155 acre site.

Maui Bird Conservation Center (MBCC)

At MBCC, improvement and repair of existing facilities is a continuous process. The "great room" and connecting offices were cleaned, painted and carpeted. Displays are being set-up in preparation for an environmental education program. An intern program was initiated in January 1998. The facility is currently being painted and TPF staff continues to remove noxious plants and facility debris. The `Alala aviaries are being retro-fitted with recycled plastic lumber and all feeding areas have been rat-proofed with new feeding tables and sheet metal siding. A drip irrigation system for native plants around the courtyard perimeter was installed.

RESTORATION/CAPTIVE BREEDING PROGRAMS

Nene

The goal for the captive propagation program of Nene at the KBCC and MBCC is to produce 20 chicks/year for the DOFAW release program. Additional chicks will be released at the KBCC to establish a free-ranging semi-captive flock (150 fenced acres with predator control). In 1998/1999, new pairings of young Nene were established at both facilities to: improve the genetic diversity and demographic stability of the captive flock and subsequently increase the long-term reproductive output. The 1998/1999 breeding season was a transitional year with most of these new pairs composed of young birds (pullets) not old enough to be fully reproductive. Fifty-seven eggs were collected at both KBCC and MBCC; 20 were viable at collection and 18 hatched (hatchability = 90.0%). Fifteen chicks survived 30 days (survivability = 83.3%); two chicks hatched and died under incubating parents. The high rate of infertility was due to the young hens (housed without males) laying pullet eggs.

In 1999 birds were relocated to establish ten pairs of potentially reproductive Nene at both KBCC and MBCC (based on genetic analysis and behavioral compatibility). It is anticipated that the captive flock will produce at least 20 chicks/year for the DOFAW program and additional birds will be released at KBCC (Table 1 and Appendix I). The current level of genetic diversity retained in the captive flock at KBCC and MBCC is approximately 95 % and the mean inbreeding coefficient is .021, based on the limited pedigree information available. Historical pedigree records from DOFAW are unavailable.

`Oma`o/Puaiohi

During the period from 1995 - 1999, two species of endemic Hawaiian thrushes, `Oma`o (*Myadestes obscurus*) and Puaiohi (*Myadestes palmeri*), were captive-reared and reintroduced into their historic range in Hawai`i by The Peregrine Fund, in collaboration with BRD and DOFAW. In 1995 and 1996, 29 viable, non-endangered `Oma`o eggs were collected from the wild, 27 chicks hatched, 25 chicks were hand-reared and 25 birds released into Pu`u Wa`awa`a Wildlife Reserve (hatchability = 93.1%; chick survivability - 30 days = 92.6%;). The `Oma`o program had three goals: 1) develop restoration techniques for the congeneric endangered Puaiohi, 2) evaluate reintroduction of captive-reared birds vs. translocation of wild birds as a potential recovery strategy for Hawaiian thrushes, and 3) reintroduce `Oma`o into non-occupied area within the species' historic range (Kuehler et al., in review; Fancy et al., in press).

Based on the surrogate work with the `Oma`o, a recovery program for the endangered Puaiohi was initiated in 1996. Fifteen viable Puaiohi eggs were collected from the wild to establish a captive breeding flock. This species subsequently reproduced for the first time in captivity in 1998 (total chicks hatched in 1996, 1997 and 1998 = 41; hatchability = 93.1%; chick survivability - 30 days = 92.6%). In 1999, five captive-bred Puaiohi hatched at the KBCC and 14 captive-bred Puaiohi were reintroduced into the Alaka`i Swamp. Both species of captive-reared thrushes fledged chicks in the wild after release. This is the first passerine conservation program using recovery techniques that include: collection of wild eggs, hand-rearing, captive-breeding and release; where reintroduced birds subsequently survived and bred in the wild (Table 1 and Appendix II). Eight chicks have fledged successfully in the wild (Kuehler et al., in review; Tweed, pers. comm.).

`Akohekohe

In 1997, the first `Akohekohe eggs were hatched and hand-reared, in cooperation with BRD and DOFAW in Maui (Table 1 and Appendix III). These birds are being maintained in captivity to develop the technology for captive propagation for future release into managed habitat. These birds are extremely territorial nectivores requiring single-cage housing in captivity. There was no sustained reproductive activity observed in captive `Akohekohe during the 1999 breeding season. Due to the limited number of individuals currently housed in captivity and the behavioral problems involved with breeding these birds (mate compatibility), more `Akohekohe are necessary to establish a captive-breeding program. Collection of wild eggs will be a work-plan priority during the year 2000 breeding season.

Maui Parrotbill

This endangered honeycreeper has a low reproductive rate (one egg clutch) and is restricted to one small patch of forest in East Maui. Immediate management of this species is a recovery priority. One nest was located in 1997, the egg was collected and the chick hatched in captivity. This bird was confirmed as a male. DOFAW staff was unable to locate wild nests in 1998.

In 1999, two eggs were collected from two different nests in collaboration with DOFAW biologists. Both eggs hatched and chicks were subsequently hand-reared (hatchability = 100%; survivability = 100%). Both of these chicks were sexed as females and will form the nucleus of a captive-breeding program for this species (Table 1 and Appendix IV). Continued collection of wild eggs will be a workplan priority in 2000.

Hawai`i Creeper

This endangered honeycreeper is endemic to the Big Island and is only found with any regularity in the Hakalau National Wildlife Refuge (HNWR). In order to develop the captive technology for this species as well as for other rare insectivorous species, eggs were collected with HNWR and BRD's assistance, hatched and reared at KBCC (Table 1 and Appendix V). Five viable eggs were collected and five chicks hand-reared in 1998 (hatchability = 100%; survivability = 100%). They will be bred in captivity for release into secure habitat. This species will also provide information for development of release techniques for semi-insectivorous birds.

In 1999, one pair of Hawai`i Creepers built a nest in captivity and two eggs were laid. Both eggs were infertile; possibly due to the young age of the birds (< one year of age) and/or disruptive behavior from other Creepers housed in the aviary. This display of reproductive activity is encouraging. Completed construction of the second Forest Bird Barn will provide additional aviary space during the year 2000 breeding season and the Hawai`i Creepers pairs will be separated.

`Alala

In cooperation with members of the `Alala Partnership, an intensive restoration program for `Alala began in 1993. During the period from 1993 - 1999, thirty-six `Alala have been hatched by TPF biologists and 34 chicks survived to fledging. Twenty-seven `Alala have been released into historical habitat in the South Kona District on the island of Hawai`i (four birds from the DOFAW captive-breeding program). Twenty-five birds survived until independence (~120 days post-release or when supplemental feeding is discontinued) (release survivability =93%) (Tables 1 and 2). Long-term monitoring of `Alala released to the wild is the responsibility of the Service and monitoring/survival/recapture information is available from the Pacific Islands Ecoregion Office.

Due to the El Nino weather condition in 1998, misting systems were installed in all `Alala aviaries to increase humidity in the breeding enclosures. Phase III construction of `Alala aviaries is ongoing and will result in four additional enclosures completed during the fall of 1999 (total = 10 aviaries at KBCC). With the completion of these breeding enclosures at the KBCC, the captive flock will be distributed between MBCC and KBCC. Non-reproductive pairs are being re-assigned and new pairs are being established based on: behavior (social vs. isolate-rearing), pair reproductive history, mean kinship, inbreeding coefficients, age, sex, health status (toxoplasmosis

infection) and enclosure site (proximity to disruptive males). Young, non-breeding birds will be housed together as a social flock. The preliminary report from the Behavior Division, Zoological Society of San Diego – Center for Reproduction of Endangered Species (CRES) on the behavior of captive-reared `Alala is presented in Appendix VII.

In 1999, five pairs of captive `Alala produced 16 eggs in captivity; (Oli /Pomaikai, Hoike/Waalanai, Lanakila/Hulai, Keawe/Hooku, Kinohi/Niele). Five eggs were viable, two chicks hatched and were successfully hand-reared (Table 1 and Appendix VI).

The current level of genetic diversity retained in the captive flock is approximately 86% and the mean inbreeding coefficient is .084, based on the limited pedigree information available.

Palila

The Palila is a large-billed, large-headed endangered Hawaiian Honeycreeper which has earned the nickname of "yellow-headed bean-eater" by virtue of its coloration and feeding almost exclusively on the bitter pods of the mamane tree. The Palila is an endangered endemic, restricted to the island of Hawai`i, and currently found only on the western slope of Mauna Kea Volcano from 6,500' - 8,500' elevation. Population estimates are from 1,000 - 3,000 birds -- but great fluctuations in the population size occur with the dynamics of the mamane pod masting. Wildfire is a significant risk to this single isolated population.

There were 11 Palila reared in the KBCC in 1996, with nine surviving for more than one year (1997). Because of the identification of *Mycoplasma spp.* in the wild and captive flocks in 1996, these birds are being held for captive reproduction and research. Future offspring will be (possibly two hens) candidates f[illegible]aptive propagation and/or release (Appendix VIII).

In 1999, one pair of captive Palila laid eggs (possibly two hens) and broke them immediately after laying. The exact number of eggs laid was not possible to determine (14?) without causing additional disturbance to the breeding birds. This aberrant behavior may have been caused by the age of the pair (young) and/or disruptive behaviors from neighboring Palila. Five eggs were salvaged and one chick hatched, but died the first day of life. Low hatchability was due to inadequate water conductance, a problem during artificial incubation of fresh bird eggs. The completed construction of the second Forest Bird Barn will provide additional aviary space and allow breeding Palila pairs to be separated from each other during the breeding season to decrease intra-specific disturbance. Additionally, because Palila are sensitive to environmental changes in their aviary, remote video-monitoring of accessible nest-sites will be set-up several months prior to the onset of breeding to further investigate the causes of egg-breakage. This will enable breeding Palila to habituate to the presence of a camera prior to the breeding season.

Hawai`i `Akepa

In 1998 the first fertile Hawai`i `Akepa egg was hatched, hand-reared and fledged; probably the

smallest passerine (1.13 grams) ever artificially incubated and hand-reared from hatch in captivity. In 1999, five wild `Akepa eggs were hatched and four hand-reared successfully (hatchability = 100%; survivability = 83.3%) (Table 1 and Appendix IX). They will be bred in captivity for future release into secure habitat.

`Akiapola`au, Nukupu`u and Po`ouli

`Akiapola`au are endemic to the Big Island with a fragmented population found above 5,000 in ohia-koa forests. The highest density is in HNWR. The population is declining and estimated to number less than 1,000 individuals. Similar to the Maui Parrotbill, `Akiapola`au could benefit from a captive propagation program given the species' current distribution, low reproductive rate, population status, and the difficulty in locating wild nests (precluding a collect-rear-release strategy). Although TPF biologists spent approximately 500 hours nest-searching in appropriate habitat in 1999, no nests were located. Searching for wild `Akiapola`au nests will be a workplan priority in 2000.

The Nukupu`u and Po`ouli are considered to be so rare that it is presently difficult to build a program around the remote possibility that nests may still be found. If and when nests are located, TPF staff is prepared to collect first clutch eggs and initiate a propagation program. No nests were located during the 1999 breeding season for either species.

Hawai`i `Elepaio

The O`ahu `Elepaio (*Chasiempis sandwichensis gayi)* once very common, has disappeared from 90% of its historic range. Approximately 200 – 500 O`ahu `Elepaio remain. Because of continuing threats to the species the Service proposed listing the O`ahu `Elepaio as endangered in October, 1998.

In 1999, ten viable Hawai`i `Elepaio eggs were collected from the wild; eight chicks hatched and seven chicks survived 30 days (hatchability = 80%; survivability 87.5%) (Table 1 and Appendix X). These birds will form the nucleus of a captive-breeding flock to produce birds for reintroduction as a surrogate species to develop propagation and release techniques for the Oahu `Elepaio.

CAPTIVE COLLECTION INVENTORY

MBCC

Species	Status
Nene (*Branta sandvicensis*)	5.7.0

`Alala (*Corvus hawaiiensis*)	6.4.0
Maui `Amakihi (*Hemignathus v. wilsoni*)	1.2.0

KBCC

Species	Status
Nene (*Branta sandvicensis*)	10.10.0
Palila (*Loxioides bailleui*)	2.5.0
Puaiohi (*Myadestes palmeri*)	9.14.0
Hawai`i Creeper (*Oreomystis mana*)	3.3.0
Maui Parrotbill (*Pseudonestor xanthophrys*)	1.2.0
`Akohekohe (*Palmeria dolei*)	2.1.0
`Alala (*Corvus hawaiiensis*)	8.6.0
`Akepa (*Loxops coccineus*)	2.2.0
Hawai`i `Elepaio (*Chasiempis s. sandwichensis*)	3.2.0

ENVIRONMENTAL EDUCATION PROGRAM

During the 1997/1998 school year, TPF hosted over 1,000 students and their teachers at the KBCC. Encouraged by the very positive response from the teachers, students and parents, this program will be continued in 1999/2000, providing this environmental education opportunity to the sixth grade classes during the forthcoming school year. It will again be coordinated with the State of Hawai`i's Department of Education and the conservation education program held at Keakealani Outdoor Education Center. Students spend two-three hours at KBCC where they are given video presentations, lectures, slides, and "hands-on" opportunities to experience some of the conservation work undertaken by TPF. Activities include cage building, planting native vegetation, insect collecting, bird watching, bird behavioral observations, and in general - how to "do" biology. A "mock" biology lab and a display aviary were built for the environmental education program (donated by the contractor for KBCC construction).

One of the additional educational opportunities which TPF employed during this past year, was in the form of "outreach" to the local schools, clubs, societies and special interest groups. For many of the interested school and community groups who do not have the resources to organize a field trip to the KBCC, we made "traveling" presentations, which included slides, posters, photos and live animals. These mobile presentations have been very well received. We estimate that our presentations in the last six months reached over 1,000 people, in addition to the school children mentioned above.

In 1999, TPF published an environmental education book for Junior High School age students entitled Treasures of the Rainforest, funded by private donations. This introduction to the

avifauna of the Hawaiian Islands will be available to teachers/classes that visit KBCC (at no cost) during the academic year. Public sales of this book will support future publications.

VETERINARY PATHOLOGY REPORT

Total collection mortality for the Keauhou Bird Conservation Center and the Maui Bird Conservation Center was 8 % (including all chicks) (Table 4). For comparison, collection mortality for American Zoo Association (AZA) institutions housing collections of passerines is approximately 15-21% (Lieberman, unpubl. data). All captive Hawaiian forest birds are necropsied by Dr. Bruce Rideout (Director of Pathology, Zoological Society of San Diego) or Dr. Thierry Work (BRD) and final necropsy findings are circulated to the appropriate agencies. Clinical care and pre-release screening is conducted by a member of our Veterinarian Consortium: Dr. Sterret Grune (Big Island Veterinary Care), Dr. Pat Morris (Associate Veterinarian, Zoological Society of San Diego), Dr. Don Janssen (Director of Veterinary Services, Zoological Society of San Diego) or Dr. Greg Massey (DOFAW). Total clinical care required at KBCC and MBCC for the contract year was 40-50 hours. Reports are kept on file at MBCC and KBCC. Reports not previously circulated are presented in Appendix XI.

During January/February, 1999, Drs. Pat Morris and Bruce Rideout (Veterinary Services Department and Pathology Department, ZSSD) participated in the reintroduction of Puaiohi in the Alaka`i Swamp, Kaua`i. This restoration program was partially funded through a grant from the ZSSD.

All clinical care provided by Drs. Janssen, Morris and Grune and pathology support by Dr. Bruce Rideout are donations to the program.

SUMMARY

During the past six years, The Peregrine Fund's - Hawaiian Endangered Bird Conservation Program has developed many of the artificial incubation and hand-rearing techniques required to propagate endangered Hawaiian forest birds. Twelve endemic Hawaiian passerine species have been hatched and reared in captivity and two forest bird species have bred in captivity. The Keauhou Bird Conservation Center was built in Volcano, Hawai`i. Additionally, an environmental education program is being funding through public support.

In 1998, the first hand-reared birds that were reintroduced, bred in the wild (`Oma`o). And in 1999, fourteen endangered Puaiohi were released in the Alaka`i Swamp, Kaua`i. All the release birds survived 30 days and at least eight Puaiohi chicks have successfully fledged in the wild. This is the first passerine conservation program using recovery techniques that include: collection of wild eggs, hand-rearing, captive-breeding and release; where reintroduced birds subsequently

survived and bred in the wild.

As the captive flocks of the endangered species grow, and the techniques for rearing and release are refined, it is hoped that many of the endangered Hawaiian birds will benefit from restoration efforts. However, captive propagation and reintroduction is only one aspect of the ecosystem management tools required in Hawai`i. Commensurate action will continue to be required on the part of land-owners (state, private and federal) to protect and enhance the native habitat.

Additional information regarding the Hawaiian Endangered Bird Conservation Program is available in our publications/presentation summary (1991-1999).

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The Peregrine Fund
Hawaiian Endangered Bird Conservation Program
Publications and Presentations: 1992 – 1999

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Community Presentations, Tours, Lectures and other Public Information Opportunities

After Dark in the Park, Slide Presentations, 1996, 1998

American Association of Zoos, Conference Presenations, 1995, 1997

Audubon Society, Hawaii, 1997

Association of University Women – Open House KBCC, 1998, 1999

Biological Resources Division of U.S.G.S. – Over 25 tours given to staff of various field programs (Hakalau, Palila, Omao, Puaiohi, Alala, etc.), 1995, 1996, 1997, 1998, 1999

Border's Books, 1998

Elder hostels, 1997, 1998, 1999
European Zoo Association – Research and Captive Breeding Symposium, 1999

Foster's Botanical Garden, Honolulu, 1997

"Going Wild With Jeff Corwin", 1998

Hawaii County Council, 1995

Hilo Hospital Staff, 1997

International Council for Bird Preservation, 1996

KBCC Annual Open House – All TPF members in Hawaii, 1996, 1997, 1998, 1999

Kihei Canoe Club, 1997

Kiwanis, 1997 and 1998, Hilo and Maui

Lyons Club, 1998 and 1999, Oahu and Maui

Mauna Loa Gardens, 1997

National Audubon Society, 1996

Rotary Club, Hilo 1997

San Diego Zoo, Aardvark's Club, 1999

Seniors' Continued Learning Association, Hilo, 1999

Sierra Club, 1996, 1998, 1999

Saint Joseph's Elementary School, 1996, 1997, 1998

University of Hawaii , Manoa – Conservation of Natural Resources, Lecture 1998 and 1999

University of Hawaii, Hilo – Conservation of Natural Resources, Lecture 1997 and 1998, 1999

Volcano Community Association, 1994

Womens Club of Hawaii, 1995

Approximately 2,500 students and their teachers were given presentations at the Keauhou Bird Conservation Center from 1996-1999.

An additional 1,000 students were given presentations in their classrooms on the Big Island from 1998-1999.